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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,578	06/12/2006	Reinhold Wimberger-Friedl	NL031454US1	1760
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EXAMINER SCHIFFMAN, BENJAMIN A				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/582,578

**Applicant(s)**

WIMBERGER-FRIEDL ET AL.

**Examiner**

BENJAMIN SCHIFFMAN

**Art Unit**

1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 16-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 16-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. The papers submitted on 29 June 2010, amending claim 1, are acknowledged.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-11 and 16-20 rejected under 35 U.S.C. 103(a) as being unpatentable over SOANE ET AL (US 6,570,714 B2) and Hanemann et al. (*Molding of Polymeric Microstructures*) as evidenced by DEALY ET AL (*Structure and Rheology of Molten Polymers - From Structure to Flow Behavior and Back Again*) and Ashby (*Materials Selection in Mechanical Design*).
6. Regarding claim 1 and 20, SOANE discloses a process for the fabrication of a composite article, such as an optical microstructure (see **abstract**), being supported on a thin substrate (see **column 4 line 40-41 and col. 10 ll. 20-30**), starting from a dead polymer, analogous to a thermoplastic polymer (see **column 4 line 54**), wherein the dead polymer is blended with a reactive plasticizer, analogous to a curable resin, (see **column 4 line 53-54**), which is curable by UV light (see **column 20 line 47 and column 24 lines 43-44**) and an initiator (see **column 4 line 54**), specifically thermally stable photoinitiators (see **column 24 lines 44-47**), to obtain a blend having a lower viscosity than the viscosity of said polymer (see **column 15 lines 4-5**), said blend being molded and the molded blend being cured by means of UV radiation (see **column 4 lines 55-63 and column 20 line 47**). Additionally Soane discloses that the thickness of the optical microstructure is approximately 0.5 to 1 mm (see **column 10 line 24**), and exemplary microstructure diameters of 55 mm and 70 mm (see **col. 28 l. 55, col. 29 l. 38 and col. 30 l. 47**); resulting in a thickness to diameter ratio of 0.007143 to 0.018182, which overlaps the claimed range of 1/50 (0.02) to 1/1000 (0.001) and therefore the claimed range is *prima facie* obvious in view of the overlapping range (see **MPEP 2144.05**). Further, SOANE discloses that the dead polymer is polymethylmethacrylate (PMMA) with a low molecular weight of 25,000 (see **col. 26 l. 67**); having a glass transition temperature, depending on processing, of 85° C. to 165° C. as

evidenced by Ashby (see p. 519), which is within the claimed range of not lower than 50° C. (see MPEP 2144.05).

7. Soane does not expressly disclose that the optical microstructures are injection molded.

8. However, Hanemann discloses a method of forming polymeric microstructures (see title) wherein a composition containing a polymer and a UV curable resin is injected into a mold and cured (see pp. 70-72 *New Process Development Photomolding of UV Curable Systems*).

9. It would have been *prima facie* obvious for a person of ordinary skill in the art at the time of the invention to have modified the compression molding process of Soane to the injection molding process of Hanemann, because compression molding and injection molding are alternate expedients and Hanemann suggests that composition which have a lower concentration of polymer, as compared to curable resin, are able to be injection molded, and injection molding is a more reliable, require less process equipment and are more cost-effective, particularly when performed at ambient temperatures, than compression molding processes.

10. Regarding claim 2, SOANE discloses that the dead polymer is polymethylmethacrylate (PMMA) with a molecular weight of 25,000, which is within the claimed range of 0.5 to 2 times the critical entanglement molecular weight, i.e. 14,750 to 59,000, as evidenced by DEALY, where the critical entanglement molecular weight of PMMA is 29,500 (see page 481).

11. Regarding claim 3, SOANE discloses that the dead polymer is substantially fully polymerized, i.e. 95% to 98% polymerized, which is analogous to a minor amount of reactive groups (see column 13 lines 33-38).

12. Regarding claim 4, SOANE discloses that the dead polymer can be amorphous (see column 21 line 45).

13. Regarding claim 5, SOANE discloses that the dead polymer can be a copolymer (**see column 21 line 64**).
14. Regarding claim 6, SOANE discloses that the dead polymer can be polymethylmethacrylate, polystyrene, polycarbonate (**see column 21 lines 37-41**), cycloolefinic polymer and cyclo-olefinic copolymer (**see column 23 lines 23-25**).
15. Regarding claim 7 and 18, SOANE discloses that the concentration of reactive plasticizer is about 0.1-100 wt%, preferably about 1-50 wt%, and more preferably about 15 to 40 wt% (**see column 14 lines 49-54**), which corresponds to about 0.1 vol% to about 100 vol%, about 1-1.5 vol% to about 45-60 vol%, or about 13-20 vol% to about 35-50 vol% respectively. This correspondence is based on a conversion using the densities of PMMA reported in KIPP (Plastic Material Data Sheets) of 1.14-1.52 g/cm<sup>3</sup> and the densities of acrylate monomers reported in BRANDRUP ET AL (Polymer Handbook 4th Edition) of 0.8-1.7803 g/cm<sup>3</sup>. These materials were chosen as they are an example, specifically example 4, of dead polymers and reactive plastic as disclosed in SOANE (**see column 26 line 66 to column 27 line 9**). These concentrations overlap, with sufficient specificity to anticipate the claimed range of 20-80 vol% or 40-60 vol% (**see MPEP 2131.03**), alternatively the claimed range is *prima facie* obvious in view of the overlapping range (**see MPEP 2144.05**).
16. Regarding claim 8, SOANE discloses that the reactive plasticizer is an epoxy resin (**see column 24 line 30 and 44**).
17. Regarding claim 9, SOANE discloses that the reactive plasticizer is acrylates or methacrylates (**see column 25 lines 2-21**).

18. Regarding claim 10, SOANE discloses that the dead polymer and the reactive plasticizer have a similar refractive index (**see column 23 line 10-14**).
19. Regarding claim 11, SOANE discloses that the substrate is polycarbonate, which is a polymer (**see column 17 line 10**).
20. Regarding claim 16, SOANE discloses a process for the fabrication of a composite article, such as an optical microstructure (**see abstract**), with a thickness of approximately 0.5 to 1 mm (**see column 10 line 24**) which overlaps the claimed range of at most 1 mm, preferably at most 0.5 mm (**see MPEP 2131.03**). Additionally SOANE discloses specific examples of thicknesses of 1 mm (**see column 30 lines 2, 59 and column 31 lines 10 and 24**). These ranges and examples display sufficient specificity to anticipate the claimed range.
21. Regarding claim 17, SOANE discloses that the epoxy resin is an ethoxylated bisphenol A diacrylate (**see column 25 lines 12-13**).
22. Regarding claim 18, although Soane does not explicitly disclose that the vitrification temperature (glass transition temperature) is above 50° C.; however one of ordinary skill in the art would recognize that the disclosed process would be capable of obtaining a mixture with these properties, and further a skilled artisan would optimize the process in order to obtain mixtures with glass transition temperatures above 50° C without undue experimentation (**see MPEP 2144.04**).

#### ***Response to Arguments***

23. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

25. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BENJAMIN SCHIFFMAN whose telephone number is (571) 270-7626. The examiner can normally be reached on Monday through Thursday from 9AM until 4PM.

27. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, CHRISTINA JOHNSON can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



28. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BENJAMIN SCHIFFMAN/  
Examiner, Art Unit 1791

/Christina Johnson/  
Supervisory Patent Examiner, Art Unit 1791